

**IN THE CLAIMS:**

Please amend the claim as follows:

Claim 1 (currently amended): A semiconductor photodetection device, comprising:

a semiconductor substrate of a first conductivity type;

a photodetection layer formed on said semiconductor substrate;

*B'* a region of a second conductivity type opposite to said first conductivity type being formed in a part of said photodetection layer; and

an electrode applying an electric field to said photodetection layer via said region of said second conductivity type such that said electric field acts in a thickness direction of said photodetection layer,

said photodetection layer comprising: a first semiconductor layer having a first thickness and accumulating therein a compressive strain and absorbing an optical radiation; and a second semiconductor layer having a second thickness smaller than said first thickness and accumulating therein a tensile strain, said first semiconductor layer and said second semiconductor layer being stacked alternately and repeatedly in said photodetection layer,

wherein said tensile strain in said second semiconductor layer has a magnitude larger than a magnitude of said compressive strain in said first semiconductor layer,

said first compressive strain in said first semiconductor layer has a magnitude exceeding 0.25%.

Claim 2 (original): A semiconductor photodetection device as claimed in claim 1, wherein said first semiconductor layer accumulates therein a strain of 0.2% or more but not exceeding 0.6%.

Claim 3 (original): A semiconductor photodetection device as claimed in claim 1, wherein said first semiconductor layer has a thickness of 50 nm or more.

*B'* Claim 4 (previously presented): A semiconductor photodetection device as claimed in claim 1, wherein a sum of the second thicknesses of said second semiconductor layers is smaller than a sum of the first and second thicknesses by a factor of  $(0.9 \times L^{1/4} \times \epsilon)$ , wherein  $\epsilon$  represents the strain accumulated in said first semiconductor layer in terms of percent and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer in terms of microns.

Claim 5 (original): A semiconductor photodetection device as claimed in claim 3, wherein the second thickness of the second semiconductor layer is smaller than one-half the first thickness of the first semiconductor layer.

Claim 6 (currently amended): A semiconductor photodetection device as claimed in claim 5, wherein a sum of the second thicknesses of said second semiconductor layers is smaller than a sum of the first and second thicknesses by a factor of  $(0.9 \times L^{1/4} \times \epsilon)$ , wherein  $\epsilon$  represents the strain

accumulated in said first semiconductor layer in terms of percent and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer in terms of percent percentage.

**b'** Claim 7 (original): A semiconductor photodetection device as claimed in claim 1, wherein each of said first and second semiconductor layers comprises a ternary compound semiconductor material.

Claim 8 (currently amended): A semiconductor photodetection device as claimed in claim 7, wherein a sum of the second thicknesses of said second semiconductor layers is smaller than a sum of the first and second thicknesses by a factor of  $(0.9 \times L^{1/4} \times \epsilon)$ , wherein  $\epsilon$  represents the strain accumulated in said first semiconductor layer in terms of percent percentage and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer in terms of microns.

Claim 9 (original): A semiconductor photodetection device as claimed in claim 1, wherein said substrate comprises n-type InP and said first and second semiconductor layers comprise n-type InGaAs.

Claim 10 (currently amended): A semiconductor photodetection device as claimed in claim 9, wherein a sum of the second thicknesses of said second semiconductor layers is smaller than a sum of the first and second thicknesses by a factor of  $(0.9 \times L^{1/4} \times \epsilon)$ , wherein  $\epsilon$  represents the strain accumulated in said first semiconductor layer in terms of ~~percent~~ percentage and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer in terms of microns.

*B'*  
Claim 11 (original): A semiconductor photodetection device as claimed in claim 1, further comprising an intermediate layer between said first and second semiconductor layers, said intermediate layer having an intermediate bandgap between a bandgap of said first semiconductor layer and a bandgap of said second semiconductor layer.

Claim 12 (currently amended): A semiconductor photodetection device as claimed in claim 11, wherein a sum of the second thicknesses of said second semiconductor layers is smaller than a sum of the first and second thicknesses by a factor of  $(0.9 \times L^{1/4} \times \epsilon)$ , wherein  $\epsilon$  represents the strain accumulated in said first semiconductor layer in terms of ~~percent~~ percentage and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer in terms of microns.

Claim 13 (original): A semiconductor photodetection device as claimed in claim 11, wherein said intermediate layer is provided at a side of said first semiconductor layer closer to said region of said second conductivity type.

Claim 14 (original): A semiconductor photodetection device as claimed in claim 11, wherein said intermediate layer has a composition profile that changes gradually in a thickness direction thereof.

$\beta'$  Claim 15 (original): A semiconductor photodetection device as claimed in claim 14, wherein said intermediate layer accumulates a tensile strain at a side thereof contacting said second semiconductor layer and a compressive strain at a side thereof contacting said first semiconductor layer.

Claim 16 (withdrawn): A fabrication process of a semiconductor photodetection device, comprising the steps of:

forming a photodetection layer on a semiconductor substrate by alternately and repeatedly forming a first semiconductor layer and a second semiconductor layer on said semiconductor substrate while changing a flow-rate of source gases without interrupting a supply thereof; and

forming an electrode on said photodetection layer so as to apply an electric field in a thickness direction of said photodetection layer,

said first semiconductor layer being formed of a ternary compound semiconductor material having a lattice constant different from a lattice constant of said substrate and accumulating therein a compressive strain, said second semiconductor layer being formed of a ternary compound semiconductor material having a lattice constant different from said lattice constant of said substrate and accumulating therein a tensile strain.

Claim 17 (withdrawn): A method as claimed in claim 16, wherein said steps of forming said first semiconductor layer and said second semiconductor layer being conducted alternately by an MOVPE process while changing a flow-rate of metal organic sources continuously.

Claim 18 (new): A semiconductor photodetection device, comprising:

a semiconductor substrate of a first conductivity type;

a photodetection layer formed on said semiconductor substrate;

*β'* a region of a second conductivity type opposite to said first conductivity type being formed in a part of said photodetection layer; and

an electrode applying an electric field to said photodetection layer via said region of said second conductivity type such that said electric field acts in a thickness direction of said photodetection layer,

said photodetection layer comprising: a first semiconductor layer having a first thickness and accumulating therein a compressive strain and absorbing an optical radiation; and a second semiconductor layer having a second thickness smaller than said first thickness and accumulating therein a tensile strain, said first semiconductor layer and said second semiconductor layer being stacked alternately and repeatedly in said photodetection layer,

wherein said tensile strain in said second semiconductor layer has a magnitude larger than a magnitude of said compressive strain in said first semiconductor layer; and

wherein a total thickness of said first and second semiconductor layers is less than  $1.5 \mu\text{m}$ .

Claim 19 (new): A semiconductor photodetection device, comprising:

a semiconductor substrate of a first conductivity type;

a photodetection layer formed on said semiconductor substrate;

a region of a second conductivity type opposite to said first conductivity type being formed in a part of said photodetection layer; and

an electrode applying an electric field to said photodetection layer via said region of said second conductivity type such that said electric field acts in a thickness direction of said photodetection layer,

*B'* said photodetection layer comprising: a first semiconductor layer having a first thickness and accumulating therein a compressive strain and absorbing an optical radiation; and a second semiconductor layer having a second thickness smaller than said first thickness and accumulating therein a tensile strain, said first semiconductor layer and said second semiconductor layer being stacked alternately and repeatedly in said photodetection layer,

wherein said tensile strain in said second semiconductor layer has a magnitude larger than a magnitude of said compressive strain in said first semiconductor layer, and

wherein said first semiconductor layer has a thickness incrementally and inclusively beginning from 50nm and ending at less than 80nm.

Claim 20 (new): A semiconductor photodetection device, comprising:

a semiconductor substrate of a first conductivity type;

a photodetection layer formed on said semiconductor substrate;

a region of a second conductivity type opposite to said first conductivity type being formed

in a part of said photodetection layer; and

an electrode applying an electric field to said photodetection layer via said region of said second conductivity type such that said electric field acts in a thickness direction of said photodetection layer,

B' said photodetection layer comprising: a first semiconductor layer having a first thickness and accumulating therein a compressive strain and absorbing an optical radiation; and a second semiconductor layer having a second thickness smaller than said first thickness and accumulating therein a tensile strain, said first semiconductor layer and said second semiconductor layer being stacked alternately and repeatedly in said photodetection layer,

wherein said tensile strain in said second semiconductor layer has a magnitude larger than a magnitude of said compressive strain in said first semiconductor layer, and

wherein said first semiconductor layer has a thickness greater than 80nm.

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**In the Drawings**

The attached sheet of drawings includes changes to Fig. 9. This sheet, which includes Fig. 9, replaces the original sheet including Fig. 9.